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Hemerocampa pseudotsugata
LYMANTRIIDAE
LGL-3-9
1499

(Not for Publication)

November 1963

Furniss
Carolin
Coulter
Mitchell
Sartwell
Wear
Wright
Sewell
Taylor

DOUGLAS-FIR TUSSOCK MOTH INFESTATIONS IN NORTHERN IDAHO AND NORTHWESTERN MONTANA

1963

By
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Division of State and Private Forestry

U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
Division of State and Private Forestry
Region 1

Missoula, Montana

1380 (3000)

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INTRODUCTION

Douglas-fir tussock moth, Hemerocampa pseudotsugata McD., outbreaks seem to be cyclic, and were first discovered in the Western United States during 1927. Most epidemics under forest conditions last about 4 years. The moth attacks Douglas-fir, subalpine fir, spruce, and grand fir. Damage is usually first noticed on ornamental trees around private homes or farm woodlots. Natural insect enemies and polyhedral viruses usually reduce epidemic populations to very low levels.

In 1961, defoliation began to be noticeable around farms and private homes in Moscow, Clark Fork, and Bonners Ferry, Idaho. Aerial surveys of northern Idaho during 1962 indicated that seven more centers, other than the three mentioned above, contained infestations. These centers were in or near: Copeland, Moyie, Albeni Falls, Hayden Lake, Coeur d'Alene, St. Maries, and Orofino, Idaho. Surveys in 1963 located four new areas: Algoma Lake, south of Sandpoint, Idaho; Mineral Mountain Lookout area, Idaho; Kalispell, and Lion Lake, near Hungry Horse, Montana.

Biological evaluations of these tussock moth infestations were made during October 1963 to determine their trend in 1964.

METHODS

Tussock moth larvae (fig. 1) feed from June to August. Adults emerge from the hairy cocoons about the middle of August. The wingless female moth lays her eggs on the top surface of a cocoon in a frothy mass mixed with her body hairs (fig. 2). Eggs hatch near the end of May.

The number of current egg masses on cocoons compared with the number from previous years has been used as a guide for predicting infestation trends. As an epidemic increases, new egg masses greatly outnumber old ones. Cocoon samples were obtained by hand picking from the lower limbs of host trees or by pole pruners from the upper limbs.

Cocoon samples were examined in the laboratory for egg masses, successful adult emergence, and were opened to determine pupal mortality.

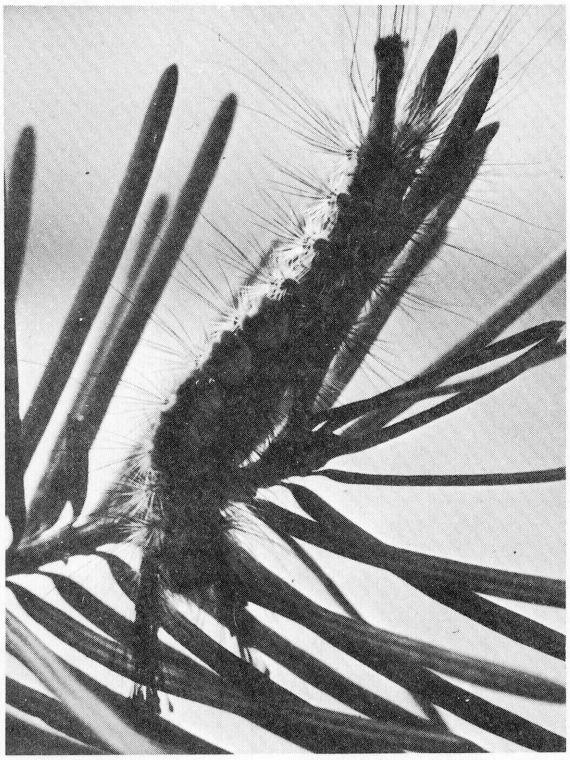

Figure 1: Full-grown larva on fir needles. Note tussocks of hair on back.

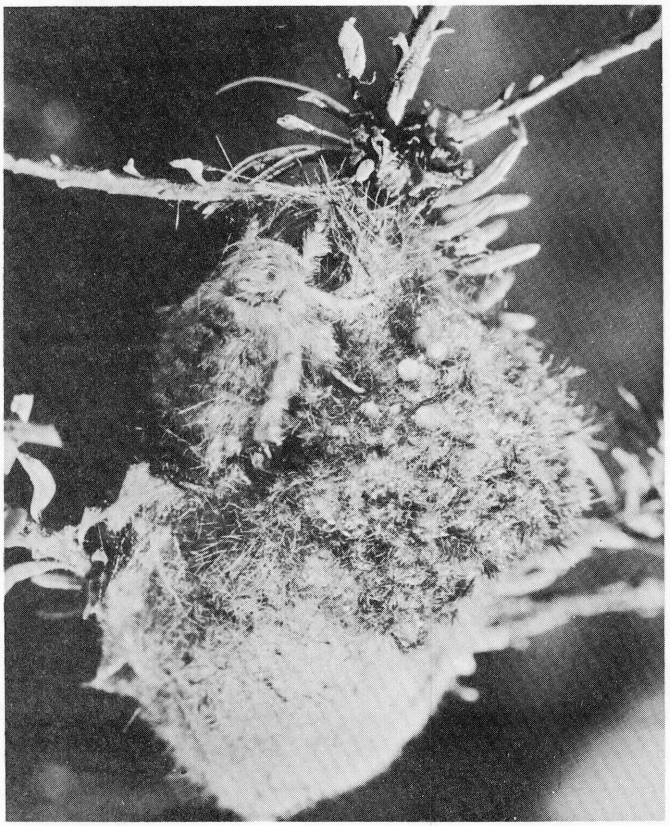

Figure 2: Wingless female tussock moth (lower left) laying eggs on a cocoon. She mixes the eggs in a mass of froth and body hairs.

RESULTS

Table 1 lists data gathered from the examination of cocoons. Probable infestation trends for 1964 in outbreak areas (fig. 3), based on percentages of current egg masses and pupal mortality are also listed in Table 1.

For the past 3 years, Dipterous parasites have been more numerous than Hymenopterous ones in the infested areas. Light egg parasitism was noticed near Kalispell, Montana.

Bonners Ferry area, Idaho - The number of infested trees around farms and homes has increased every year since 1961. Several infested tree groups were sprayed in 1961 and 1962 which eliminated the moth from them. The State of Idaho in 1963 sprayed about 95 percent of the infested trees, but in some cases the insecticide was either ineffective or applied after many of the larvae pupated. In October, numerous egg masses were collected from some of the sprayed trees. A group of 15 unsprayed grand fir in a farm woodlot, that were heavily infested during 1962, had no 1963 egg masses on them. This might indicate that a virus disease is spreading.

Defoliation during 1964 will be about the same in the Bonners Ferry area because more than half of the population was killed in 1963.

Copeland, Idaho - Damage has not spread. Trees infested in 1962 were defoliated again. Trees sprayed still contain small numbers of 1963 egg masses. One group of 10 unsprayed Douglas-fir trees has a heavy egg population. The Copeland infestation will probably increase during 1964.

Clark Fork, Idaho - Outbreaks started about 1961 in three spots. During 1962, infestation spread to four other yards. No new trees were attacked in 1963. Defoliation was light this year and 1963 egg masses were not abundant. This infestation will probably decrease in 1964.

Algoma Lake area, Idaho - Infestation consists of six ornamental trees around a home located south of Sandpoint, Idaho. These trees were sprayed in August and contain a medium 1963 egg population. There are enough current egg masses to cause increased defoliation in 1964.

Albeni Falls, Idaho - Only one group of five trees was infested in this area during 1962. They were sprayed by the State of Idaho in 1963 and only a few current egg masses were present in October. Defoliation should be slight in 1964.

Hayden Lake, Idaho - The number of infested spots has been decreasing since 1961 in this area because of spraying. Only one home with five trees in the yard was not sprayed in 1963. These trees harbored numerous 1963 egg masses - enough to cause increased defoliation during 1964.

Table 1.--Trends of Douglas-fir tussock moth infestations in northern Idaho and northwestern Montana based on abundance of current egg masses and percentages of pupal mortality during October 1963

Cocoon collecting areas	Total number of cocoons examined	Cocoons bearing egg masses		Pupae in cocoons				Total percentage and pupae killed	Probable infestation trend for 1964
					Killed by:				
		1963	Older	Successfully emerged	Diptera	Hymenoptera	Unknown agents		
Bonners Ferry, area, Idaho	700	218 53%	192 47%	553 79%	51 7%	11 2%	85 12%	21	Static
Copeland, Idaho	226	105 64%	60 36%	201 89%	9 4%	4 2%	12 5%	11	Increase
Clark Fork, Idaho	191	48 54%	41 46%	125 65%	11 6%	6 3%	49 26%	35	Decrease
Algoma Lake, south of Sandpoint, Idaho	130	52 61%	33 39%	110 85%	3 2%	1 1%	16 12%	15	Increase
Albeni Falls, Idaho	106	15 25%	44 75%	67 63%	18 17%	3 3%	18 17%	37	Decrease
Hayden Lake, Idaho	177	89 85%	16 15%	124 70%	10 6%	5 3%	38 21%	30	Increase
Coeur d'Alene, Idaho	548	317 89%	40 11%	466 85%	20 4%	6 1%	56 10%	15	Increase
Mineral Mountain Lookout, T. 43 N., R. 4 W., Idaho	22	10 83%	2 17%	15 68%	0 0%	2 9%	5 23%	32	Increase
Kalispell, Montana	379	105 61%	68 39%	256 67%	6 2%	14 4%	103 27%	33	Static
Lion Lake, near Hungry Horse, Montana	38	0 0%	3 100%	18 47%	4 10%	3 8%	13 34%	52	Decrease

Coeur d'Alene, Idaho - There are still about seven infested yards within and north of the city limits. Approximately 50 trees contain heavy 1963 egg masses. Some trees were sprayed this year. The infestation will probably increase during 1964.

Mineral Mountain Lookout, Idaho - Several acres on top of this mountain in T. 43 N., R. 4 W., contain grand fir trees with light 1963 egg mass populations. This is the only known stand of timber, other than farm woodlots, infested in Idaho. Defoliation will probably increase during 1964. Parasites and predators are usually more abundant within forest stands than in isolated groups of trees. Natural mortality may reduce this infestation to an endemic level.

Kalispell, Montana - About 1,400 acres southwest of Kalispell were heavily defoliated for the first time in 1963. A polyhedral virus disease killed most of the larvae in the north part of this infestation. Egg masses were scarce in the middle of it, but abundant near its southern end. This is the largest forested area infested in the Northern Region. The land belongs mostly to the State of Montana and private individuals. Control may be necessary to keep the outbreak from spreading and the larvae from killing partially defoliated trees, providing that the virus does not spread throughout the infested area.

Lion Lake area, Montana - About 10 acres of timbered land surrounding this lake, which is near Hungry Horse Reservoir, contained a light population. Defoliation was hardly noticeable. No 1963 egg masses were found. This infestation will probably decrease in 1964.

Moth populations that were active in Moyie, Moscow, St. Maries, and Orofino, Idaho, during 1962 produced no 1963 egg masses. Trees were sprayed in Moyie and Moscow during 1963. The other two infestations were very light to begin with and natural mortality probably eliminated the moths.

DISCUSSION

The State of Idaho, during the summer of 1963, sprayed about 1,055 infested trees in areas between Coeur d'Alene and Copeland, Idaho. They used the insecticide malathion, and mixed 1 quart (probably contained 1 pound actual) in 100 gallons of water. It was applied by a truck mounted power sprayer.

It is suggested that DDT be used instead of malathion in areas where there is no danger of livestock eating contaminated foliage, grass, etc. A DDT emulsion (concentrates usually contain about 25 to 40 percent DDT) diluted with water so that each 100 gallons of spray solution contains 1 pound of actual DDT is recommended. Sprays should be applied about the last week of May or first 2 weeks in June after the larvae hatch from the eggs and start feeding. This timing would save considerable foliage from being eaten. A respray early in July would help insure successful control. Once the larvae pupate (end of July), they are difficult to kill.

Difficult? impossible!

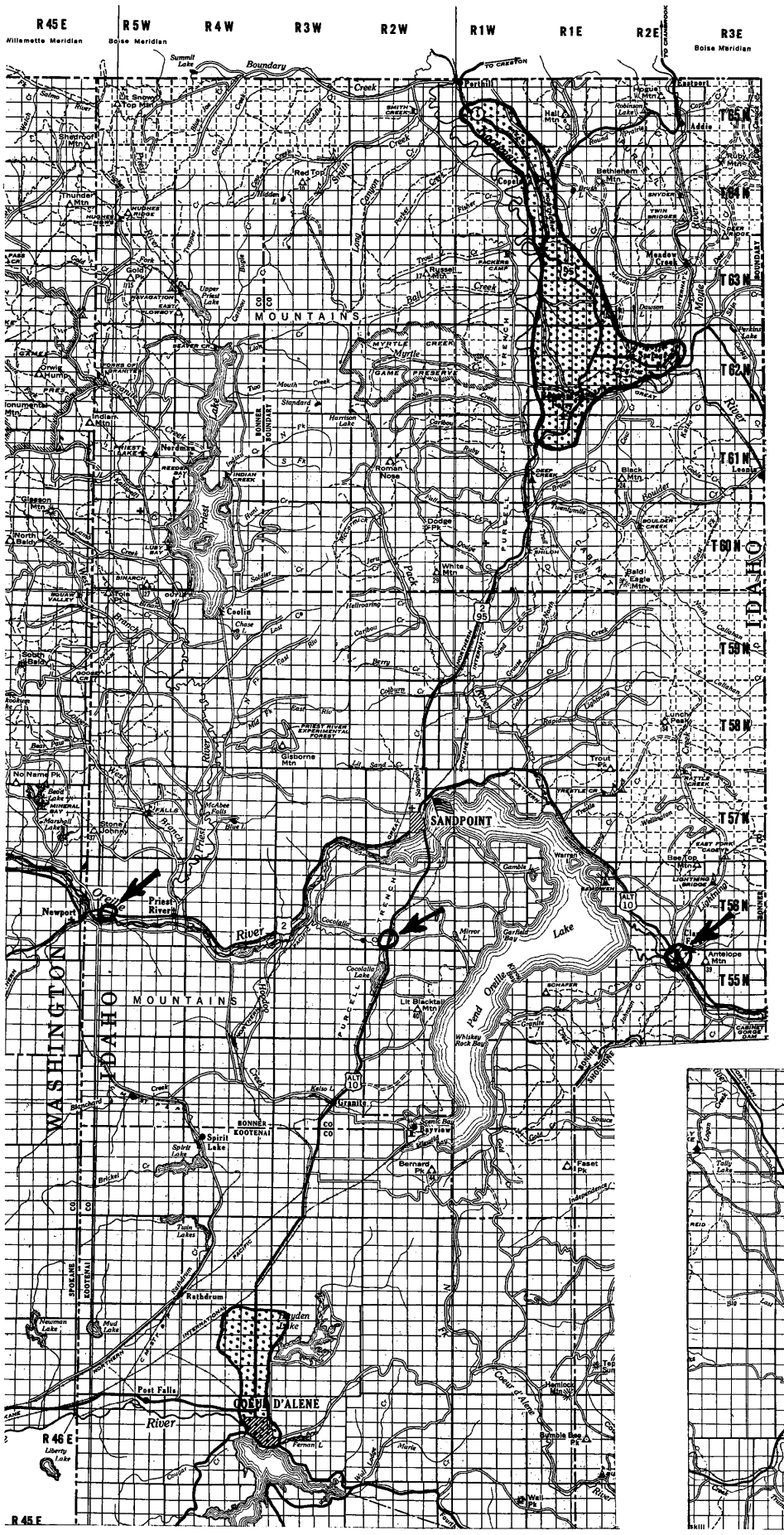

Figure 3. -- Area containing Douglas-fir tussock moth infestations in northern Idaho and northwestern Montana during 1963.